AVIATION

The Oldest American Aeronautical Magazine

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Modern American pursuit planes—a Curtiss and two Boeings

Drawn by B. M. Johnson

VOLUME XIX

NUMBER 1

SPECIAL FEATURES

2800 OX5 ENGINES SOLD

THE USES OF WATER RECOVERY

FATIGUE TESTS ON NON-FERROUS METALS

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JULY 6, 1925

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CONTENTS

Editorials	5	Dodge Buys 2592 OX5 Engines	11
The Uses of Water Recovery	6	Air Transport Costs	11
New French Deck Fliers	8	Clutches and Transmissions for the RS1	12
The Ford Mooring Mast	8	N.A.C.A. Report	13
Sale of New Liberty Engines	8	1924 Aircraft Exports	13
Who's Who in American Aeronautics	9	Airports and Airways	14
Some Fatigue Tests on Non-Ferrous Metals	10	United States Air Forces	16

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The Eclipse of the Flying Boat

DURING the course of a conversation, a well known pilot brought out the fact that the flying boat for commercial purposes seemed to be dropping out of use. As one of the staff of AVIATION owns and flies a "boat," the remark naturally caused discussion. Actually there appears to be considerable truth in the pilot's statement. Along the Atlantic coast there seems to be a decrease in the number of flying boats. Immediately after the war there was probably more passenger carrying in the East with flying boats than with land planes. There were several large companies operating, notably the Aero Limited and the Aeromarine Airways. These two companies have discontinued this service, and though the Curtiss Metropolitan Co., and Harry Rodgers are still operating it is undoubtedly true that there are fewer flying boats in commercial operation than there used to be. And what is more to the point with the one exception of the Loening Air Yacht there have been no new commercial flying boats built except for experimental purposes.

To one who is fond of the water, this is rather discouraging and not easy to account for. Flying over the water has so much charm and so many advantages when compared with land flying that its popularity should increase. The water makes a continuous landing field, and one can fly low without any worry or danger. From the commercial point of view the flying boat or seaplane has the advantage of having a ready made landing field near the center of every coastal city. Equally important, it is competing with boats, whose maximum speed is less than half of that of the railroads. Of course, water flying is more difficult than land flying, as one has to have a knowledge of seamanship as well as airmanship. The necessary skill can be acquired, but there are two other factors which have contributed even more to the eclipse of the flying boat. One is the fact that the operator of a water and aircraft has to maintain a boat, and a very delicate boat at that, as well as an airplane. The other is that most of the older types of flying boats were not only under-powered but had distinctly bad flying qualities.

Neither of these defects are necessarily inherent in the flying boat, but the engineering problems involved are much more complicated than those of a land machine and the design of flying boats is considerably behind that of land planes.

The use of light metal alloys is gradually solving the maintenance problem for hulls, but the initial cost is still prohibitively high. The few modern flying boats which have been built recently show that they can be made as safe, aerodynamically, as a land machine. On account of the greater cost and difficulty, the development of the flying boat will continue to lag behind that of the land plane, but the many attractive features of over water flying will keep it from being entirely neglected.

Cooperation

THE War Department has recently approved a policy of giving all line and general staff officers aviation training. The purpose of this instruction is to further cooperation between the Air Service and the other branches of the Army. This move will undoubtedly increase the knowledge of the value of aircraft among the officers of the other combat branches although it will be some time before the number of officers so instructed will become great enough to have an appreciable effect.

If there were one or two officers in each regiment who had had at least ten hours actual flying there would be less likelihood of that regiment complaining of lack of cooperation. The statement that "aircraft are helpless without ground protection" would not be so frequently heard if a fair percentage of the line officers knew something about aircraft. Many ground officers have no conception of the effect on their organizations of a direct aerial attack. They read statistics showing that, in the last war, few casualties resulted from such attacks. They do not read that whole regiments were disorganized for as much as twelve hours when caught in the open.

There is a great controversy raging at the present time over the advisability of forming a separate air force. While giving every line officer experience in the air will tend to knit the Army together tactically, it will eventually aid the proponents of the separate air force by giving the rank and file of the Army a better realization of the power and worth of aircraft.

The Widening Circle

Many applications of a device had their start in some spectacular or special use. The true field of application of the airplane is even now only imperfectly realized. To cite a particular example, a mine is projected on the eastern slope of the Andes at an elevation of twelve thousand feet. The only way that material can be carried to the location is on the backs of burros. The maximum load is four hundred pounds. To operate the mine, pieces of machinery weighing up to one thousand pounds must be carried. The use of an airplane is contemplated to carry these pieces. When the machinery is installed, the airplane could be destroyed and still the operation would show a big profit.

There are many mineral deposits in inaccessible places. Aircraft could reach many of them with comparative ease. This would be a special use of aircraft, but in time will become an important part of their field of usefulness. In British Guiana, a seaplane is used to take patients to the hospital on the coast. By this means, nearly two weeks is saved, very often the difference between life and death.

The Uses of Water Recovery

By HUMPHREY F. PARKER

Associate Fellow, Royal Aeronautical Society

Water Recovery is now in use as regular equipment on the airships Shenandoah and Los Angeles, and it has been conclusively demonstrated that an amount of water can be recovered from the exhaust gases from the engines, in flight, which more than equals the weight of fuel consumed in producing those exhaust gases. While this is an interesting novelty, it may be wondered just what the value of the system may be, and it is the purpose of this article to outline a few uses to which it may be put.

Conserves Lifting Gas

The first is the conservation of lifting gas. In an airship it is necessary to maintain an approximate balance between the lift exerted by the helium or hydrogen in the gas cells and the weight, represented by structure, crew, fuel, ballast, etc. If there is an excess of lift it may be corrected by permitting some of the lifting gas to escape, while an excess of weight is taken care of by throwing over ballast. In flight, correction may also be effected by flying the ship nose up or nose down. In this case the hull acts somewhat as the wings of an airplane, and the reaction of the air upon it gives dynamic lift, which increases the lift if the nose is pointed upwards, and augments the weight if the nose is pointed down. This method of correction however is limited in its application, and, while it may be used to overcome slight discrepancies in equilibrium, it cannot take care of that caused by the burning of fuel. This obviously results in a reduction of the gross weight of the ship, which calls for the release of lifting gas to maintain equilibrium.

This is an expensive proceeding, especially with helium. To operate the Shenandoah at cruising speed, it would be necessary to valve helium to the value of $1,000 per hour. Even if this could be afforded, there is not enough helium available to refill ships operated in this fashion. Consequently, if helium is to be used at all, some means must be found to prevent its waste. With water recovery the gross weight of the ship may be kept constant, so that it becomes unnecessary to release any lifting gas.

With hydrogen, it is usually considered that the gas is so cheap that it may be allowed to escape without serious loss. Alternatively, it is sometimes argued that water recovery involves the installation of weighty apparatus, and that the reduction in useful load accompanying this cannot be tolerated. Figures of actual costs are unfortunately not yet available, but it is possible to show that the saving in the cost of hydrogen is greatly in excess of the value of the space sacrificed.

Weight not Prohibitive

Taking as a basis estimates made by Commander Burney for his proposed service from England to India, which is now actually being proceeded with in a modified form, and converting his figures on the basis of five dollars to a pound, his cost of hydrogen per annum becomes $500,000. The corresponding figure for depreciation, insurance, and repairs is $1,750,000 per annum. On the basis of the results obtained on the Shenandoah the weight of apparatus necessary to effect water recovery may be placed at less than 2 per cent of the gross lift of the ship; on the large ships now authorized for the England to India service the deadweight will amount to 50 per cent of the gross lift. To restore the original useful load to a ship equipped with water recovery would therefore involve increasing its gross lift by 4 per cent. This would increase the capital charges by an approximately corresponding amount, so that, to carry the useful load originally contemplated, water recovery involves an increase in the annual charges of $70,000, and offers a saving of $500,000. The ratio between these figures indicates that water recovery should be a very useful proposition even with hydrogen.

In actual practice it is probable that water recovery will result, not in a loss of useful load as considered above, but in an actual increase. An airship must carry emergency ballast, and without water recovery this must be taken aboard at the start and is a deduction from possible useful load. With the new system the recovered water may be used as ballast, so that more useful load may be taken on at the start and the ballast manufactured en route. This might involve the possible discharge of fuel to meet an emergency arising early in the course of a flight, but special "slip tanks" are provided for emergencies in any case, and to extend their use to this added case would seem permissible since it would not prejudice the safety of the ship and would permit useful gains.

The amount of useful load that must be sacrificed to provide emergency ballast is a very debatable point. The wartime practice of the Germans, it is understood, was to fly with no ballast at all; it can only be assumed that they treated maneuvering risks as added war hazards and risked the loss of ships from this cause in order to obtain increased military value. Such risks cannot be taken in peace time. An idea of the absolute safe minimum may be gained from the amount carried by the R-34 in crossing the Atlantic; this represented 5 per cent of the gross lift, and in that case, if ever, useful load could not be sacrificed unnecessarily. One or two examples of emergencies in which such ballast would prove useful may serve to illustrate the necessity for an adequate reserve.

Saves Extra Ballast

The first is the loss of a gas cell. The material forming the walls is a very light fabric, and though strong enough to meet all ordinary loads, is none the less delicate and liable to be punctured by accident. Such a puncture could occur for example through some article coming in contact with a propeller blade. This would damage the propeller, and the article, probably with pieces of the propeller in addition, would be thrown outwards. As there is about one chance in three of any one of these pieces being thrown into the hull, and in this case the piece would very probably also pierce the gas cell, the danger is an appreciable one. It cannot be said for certain that a careless passenger might not drop something overboard and that this article might not cause the puncturing of a gas cell, nor is it certain that a cell might not be punctured from some other accidental cause just as a surface ship is liable to have a watertight compartment flooded by accident.

It therefore seems prudent to require that an airship should be able to keep the air in such an emergency. To do this she must be able to jettison weight equal to the lift of the lost cell, and under present conditions of operation there are times toward the end of a flight when she would not be able to do this, since the weight to be sacrificed might amount to 9 or 10 per cent of the gross lift in the case of the largest cell. With water recovery the emergency could be met in the early stages of a flight as well as at present, and could also be met at any other time without involving any additional sacrifice in lift.

Another emergency that might arise is the complete exhaustion of the fuel supply. A large reserve will of course always be carried, but even when this amounts to 50 per cent of that necessary for a given journey under normal conditions, head winds might be encountered and the ship find herself with insufficient fuel to reach a base. Without ballast she would in all probability come to earth during the first night after the stoppage of her engines. This would not be a violent descent, but a gradual fall due to the loss of lift from temperature variations between gas and air. In the worst, and usual case, the gas would become superheated during the day, attaining a temperature in excess of atmospheric

due to the absorption of some of the sun's heat by the outer cover and the transference of a portion of this to the gas itself. This would cause what is known as false lift, and its immediate effect on a ship with engines stopped would be to cause it to rise to pressure height and to lose gas until the remaining lift balanced the weight of the ship. As soon as the sun ceased to shine the gas would start to cool to the atmospheric temperature, the volume and the lift would fall in consequence, and the ship would descend. A similar effect might occur due to a rise in the air temper-

Fairey IIID (450 hp. Napier Lion) naval observation plane of the British Royal Air Force at the moment of taking off in the harbor at Malta. Machines of this type are used by the R.A.F. for operations from shore stations and from aircraft carriers

ature. So long as air and gas remained at the same temperature and the gas cells were less than full, equilibrium would not be disturbed, but as there would probably be a lag in the rise of the gas temperature there would be a loss of lift. Even though this loss of lift might be small, if the ship had no ballast available she would settle to the ground.

Under such conditions a commercial ship would probably find herself with perhaps 5 per cent of water ballast and this would enable her to keep the air for one night. The next day superheat would probably occur again and on the loss of this she would come to earth. With water recovery about 25 per cent of the gross lift would be available as ballast and a ship so equipped could stay up for several days, during which time something could probably be done toward rescuing her.

Advantages in Maneuvering

With hydrogen there is a risk of the destruction of the ship through the burning of the lifting gas; this is eliminated by the use of helium — at a price. This price is 8 per cent of the gross lift, which is a very severe tax on the performance of an airship. While the added safety conferred, as compared with hydrogen as used in the past, may justify this price, the possibility exists of securing safety by other means at a lesser price. For example, mixtures of helium and hydrogen, and combination gas cells with the hydrogen protected by a layer of helium, have been suggested. These may or may not be successful, but another method is available as an adjunct to water recovery. This is the insulation of the hydrogen by a surrounding layer of cooled exhaust gas.

It is known that such an insulation is remarkably effective as a protection against fire, being proof even against incendiary bullets except when these are directed in a stream against a single spot. Nitrogen was first suggested for this purpose, and the use of exhaust gas is at present being strongly advocated by Commander Boothby for the large ships now being started in England. By merely filling the space between the gas cells and the outer cover with exhaust gas and modifying the ventilation arrangements, it is at least possible that a degree of protection against fire comparable with that obtainable from helium may be secured. There is little doubt that it would prove completely effective against lightning, and for peace time uses would probably fail only against a fire that would endanger the ship without igniting the hydrogen. Even on a helium ship there is the danger of fire from gasoline. It is very difficult to keep the long fuel lines absolutely tight, and a leak in the keel space offers a better chance for the start of a fire than the hydrogen does. Such a fire might be extinguished on a helium ship, whereas it would probably spread to hydrogen were that gas present, and cause the destruction of the ship. With exhaust gas insulation the fuel tanks and lines will be within the insulation space so that the danger of a fire from the gasoline will be less than in a helium filled ship without insulation.

This protection cannot be secured for nothing, but if used in conjunction with water recovery the necessary exhaust is available ready cooled, and the cost of completing the installation should not exceed one per cent of the gross lift, at a liberal estimate. This figure covers apparatus to render the gas non-injurious to the gas cells, fabric partitions within the hull, and gas delivery arrangements.

Silences Exhaust Noise

Finally, water recovery offers two additional minor advantages, it acts as a complete silencer to the exhaust noise, which is a matter of distinct interest when passengers are being carried, and the recovered water may be filtered and used for purposes other than ballast. It has actually been rendered potable, and should certainly be available for radiator reserve and for passengers' use for washing, etc.

Summarizing then, with helium the use of water recovery to conserve the gas is essential, and even with hydrogen conservation results in a very considerable net saving; the process provides reserve buoyancy, and hence protection against emergencies, in excess of that which could reasonably be provided by other means; it makes possible an increase in the useful load, since the apparatus weighs less than the minimum landing ballast that must be carried, which may be manufactured en route instead of being taken on at the start; it provides protection against fire comparable with that obtainable from helium at a price in lift of one per cent of the gross lift as against 8 per cent; it completely silences the noise from the engine exhausts, and provides water suitable for radiator and for domestic purposes.

New French Dock Fliers

The French navy has been developing rather an interesting type of plane for use on ship board and for overseas reconnaissance. The normal land machine if it has a forced landing on the water will in most cases nose over as soon as the wheels and landing gear touch the water. This can be avoided sometimes by skilfully pancaking but in any case the machine noses over as soon as it settles in the water and it is only a question of a short while before the machine sinks. The new French machines have a detachable landing gear which can be dropped in flight and the bottom of the fuselage is heavily reinforced and fitted with water tight bulkheads. The strengthening of the bottom and the bulkheads add little to the weight of the plane so that it has approximately the same performance as a normal land plane but in case of trouble the pilot is much safer and the chances of salvaging the plane and engine is very much better. The tests of these machines were conducted in smooth water and as far as one can judge from photographs the machines were undamaged and only the fabric on the lower wings would have to be renewed.

Except for the above mentioned features the Levasseur machine is a normal threeplace observation machine. It is fitted with a 450 h p Hispano-Suiza motor.

Span	40 ft. 8 in
Length	24 ft 10 in
Height	10 ft. 2 in
Area	398 sq ft
Useful load	1400 lb
Total weight	3660 lb
Weight per sq ft.	10 lb
Weight per hp	8.8 lb
High Speed	140 mi./hr
Low Speed	62 mi./hr
Ceiling	24,000 ft
Climb to 16,400 ft	22 min

The F. Vilbers type VIL.LLA seems to be more especially designed for the demands of the work. The lower wing is very small and set high up on the fuselage so that it does not come in contact with the water on landing. It is also fitted with small wing tip floats and in smooth water the machine should sustain no damage in case of forced landing. The tail floats well out of water and only the sump of the engine is immersed.

Span upper wing	42 ft 8 in
Span lower wing	23 ft 1 in
Length	30 ft. 6 in
Height	12 ft
Chord upper wing	8 ft 1 in
Chord lower wing	3 ft 6 in
Area	500 sq ft
Engine Hispano-Suiza	450 hp.
M ph speed	134 mi./hr
Climb	19,680 ft in 28 min

The Ford Mooring Mast

Foundations are complete and steel work is well under way on the largest airship mooring tower in the world, located at the Ford Airport in Dearborn. The tower, according to present schedules, will be ready for use early in July. A visit during the summer from one of the great naval airships may be expected as a first test of the unusual engineering features of its design.

Erected by the Ford interests as a contribution to the advancement of commercial aeronautics, the tower will be used by the Aircraft Development Corp for the mooring of its first all-metal airship which is now under construction. It will constitute an important unit in the airport which includes an airplane factory, hangars, and flying field.

The tower will be 210 ft high, 44 ft higher than that at the United States Naval Air Station, Lakehurst, N J. The three legs on which it will stand are 71 ft apart at the bottom and between them will be erected a building to house the mechanical equipment, its attendants and a station for air travelers. A five-passenger inclosed elevator will run to a height of 176 ft, beyond which an inclosed stairway will reach to the operating platform just below the mooring device by which the bow of the airship is fastened to the tower. From the operating platform, the airship will be boarded from an inclosed gangplank.

In design and equipment the structure will incorporate the most advanced ideas of aeronautical engineering. Special electrical winches maintaining even tension on the drawing cables will permit easy approach of the airship's bow to the anchoring device and prevent sudden strains due to gusts of wind as the ship is being drawn down to the mooring point. Pipe lines to the top of the tower will supply the moored ship with hydrogen or helium gas, water, and gasoline. Telephone wires also will run to the ship through the tower top.

The building at the base of the tower will be in harmony architecturally with the Ford Engineering Laboratories and the radio station which are approximately one mile to the northwest.

Located within the building will be the main electrical switchboard, pumps and winches. Sleeping quarters will be provided for the crew and every possible facility for the comfort of guests and passengers has been planned.

Foundation pedestals to which the tower legs are fastened are blocks of concrete 12 ft. by 15 ft. and extending 12 ft. into the ground to hard clay. They are designed to withstand a pressure of 205,000 lb. and an uplift of 100,000 lb. each. The pulling and pushing strains on the legs vary as the airship circles the tower in varying winds. Built to withstand a wind load of 45 lb per sq ft, the tower will be tornado-proof. Steel work will weigh approximately 70 tons.

The mooring device by which the airships will be anchored consists of a funnel-shaped member on the tower into which fits a cone on the bow of the ship. This is drawn into place by a cable. When the coupling is made, the ship is free to rotate about the tower with her bow "into the wind." The anchoring operation will be in charge of a mooring master stationed on the operating top where electrical controls of the winches are to be located. Casting loose may be instantly accomplished either from the ship or the tower.

Forming a circle about the tower at a radius of 625 ft are 24 concrete anchor blocks embedded in the earth. These are to be used to guide the "surge lines" when the airship is being drawn to the mooring tower. The surge lines are two cables from the bow of the airship, which, stretched out at equal angles to its length through the anchor blocks and back to the winches, steady the ship as it approaches the mooring top. The circle of blocks provides for the anchoring of surge lines in wind from any quarter.

As many as 1,000 men may be required to land an airship on the ground and then only with great risk, while fifteen men stationed on the tower can accomplish the anchoring with reasonable safety. The mooring mast makes possible landings in heavy winds when ground landings would be impossible.

Sale of New Liberty Engines

The Air Service has released for sale, for use exclusively for flying purposes within the territorial limits of the United States, one hundred and seventy (170) new Liberty "12" 400 hp airplane engines, which are stored at the Little Rock Air Intermediate Depot, Little Rock, Ark.

These engines are so well and favorably known in aviation circles as to require no introduction or descriptive remarks. They are complete with the usual kit of tools, but no spare parts or accessories are included.

They are offered "as is" f.o.b. cars or trucks at point of storage at the price of two thousand dollars ($2,000.00) each, plus a handling charge of ten dollars ($10.00) per engine.

Orders will be received for one or any number of the engines offered, subject to prior sale. Orders will be filled in the sequence in which they are received.

Terms of sale. Twenty per cent (20%) of the amount of the purchase price, in the form of cash or certified check payable to the Finance Officer, U. S. Army, must accompany all orders, the balance of the purchase price must be remitted and shipping instructions furnished on the engines awarded within thirty days from date of award.

Address all orders as follows: Office, Chief of Air Service, War Claims & Material Disposal Section, Room 2613 Munitions Building, Washington, D. C.

"Who's Who in American Aeronautics"

The second edition of "Who's Who in American Aeronautics" will be published Sept 1, 1925. Below will be found new biographies that will appear in the forthcoming volume. An invitation is extended to all pilots actively engaged in aviation military, naval or commercial to send their biographical sketches for insertion in the next issue. The book will contain the biographies of practically all the leading persons in American aeronautics. The price of the book will be two dollars. Orders are being taken in advance as the edition is limited.

George Seay Wheat

WHEAT GEORGE SEAY, Publicity, born, Gallatin Tenn Sept 14 1886 son of Frank Wheat and Clara (Seay) Wheat married Easley Hodgson June 10, 1917

Educated University of South, Sewanee Tenn 08

Professional New York Press, 1908 New York Evening Sun, 1910, New York Herald, 1910 until War

Aeronautical Activities Author Aeronautical Landing Fields and Air Ports 1921 editor 1920 to date Wright Aircraft Builder publicity for Wright Aero Corp founder Paterson Chapter N A A member Publicity Committee N A A; member Aeronautical staff New York University

War Service Mar 6 1917 to Dec. 23 1918 U S Navy Cruiser and Transport Force between Norfolk and Brest

Books Written Story of American Legion Aeronautical Landing Fields and Airports

Member Army and Navy Club (Wash.); Racquet Club (Wash); Army and Navy Club (N Y); Fraternity Club Newspaper Club

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Robert B. C. Noorduyn

NOORDUYN ROBERT B C Aeronautical Engineer, born Nymegen Holland April 6, 1893 son of Bernard Noorduyn Jr and Harriet Ellen (Churchill) Noorduyn, married Bertha Hilton Pigget Oct 5 1921

Educated Rotterdam Holland Rotterdam College and Rheinircher, Technikum Bingen Germany

Aeronautical Activities 1913, T W K Clarke & Co, Aeronautical Engineers Kingston Eng; 1913 14 Sopwith Aviation Co Kingston England 1914 to 1917 Sir W G Armstrong Whitworth & Co. Newcastle on Tyne 1917 Sir Wm. Angus Sanderson & Co Newcastle-on-Tyne 1917 to 1919 British Aerial Transport Co London England 1920 to 1923 Netherlands Aircraft Mfg Co New York City 1923 to date General Manager Atlantic Aircraft Corp.

Flying Rating F A I Pilot s License

Member S A E

Present Occupation Treasurer and General Manager Atlantic Aircraft Corp

Address Hasbrouck Heights N J, home Henry St Hasbrouck Heights N J

Alexander Varney

VARNEY ALEXANDER Commercial Aviation born Delovan Ill. Feb 15 1901 son of George E Varney and Eliza (Giles) Varney

Educated General Science course at Des Moines University (2 yrs)

Professional Gypsy flying during 1920 Organized Varney Aircraft Co 1921 President and Chief Pilot

Aeronautical Activities Learned to fly Curtiss Iowa Flying School Des Moines Ia 1919 1920

Book Written Home Study Course of Aeronautics.

Member A. G K; Aero Club of Iowa Peoria Flying Club

Present Occupation President Varney Aircraft Co

Address P O Box 502 Peoria Ill home Mt. Hawley Road Peoria Ill

Glenn H Hoppin

HOPPIN GLENN H Aircraft Manufacturing born Dexter Minn Aug 12 1880 son of William P Hoppin and Callie H (Paddock) Hoppin married Frances Stout Nov 22 1910

Educated University of Minn E E '08

Professional Tri State Telephone Co 1901 to 1905 University of Minn 1906 to 1908 Washington Water Power Co 1908 to 1920

Aeronautical Activities Stout Engineering Laboratories Inc 1920 to 1922 Stout Metal Airplane Co. 1922 to date

Member Masons Detroit Athletic Club N A A

Present Occupation Ass t. Sec'y Treas. Stout Metal Airplane Co.

Address Ford Airport Dearborn Mich home 146 Davison St Detroit Michigan

Porter Hartwell Adams

ADAMS PORTER HARTWELL, Experimental Engineer born Andover Mass Aug 10 1894, son of Charles A. Adams and Jennie H (Porter) Adams, married, Dorothy Johnson, April 26 1924

Educated Clark School, Pasadena, Calif Chauncy Hall School, Boston, Mass; University of Redlands (Calif), Mass Inst of Tech.

Professional Engineer and General Manager Bash—Adams Engineering Co, Boston Mass. from 1919 until beginning of the World War. Inventor and patentee of various automotive signalling devices, etc

Aeronautical Activities Special work for Connecticut Aircraft Co and Cooper Aircraft Co, 1915 Flying and working with Donald Douglas on original World Flight plans at Los Angeles Calif 1916 Technical adviser American Aerial Corp Boston 1920-1921 one of original incorporators N.A.A, 1922 Governor and District Vice President since that time. Chairman Executive Committee and member National Contest Committee, Chairman Boston Municipal Air Board appointed by the Mayor 1922 to date Chairman, Aviation Committee, American Legion, President Aero Club of New England Vice-President Aero Club of Massachusetts Member Aviation Committee Boston Chamber of Commerce, Member Massachusetts State Advisory Committee on Boston Airport Vice President Naval Aviation Association Member Standards Committee Society of Automotive Engineers

War Service Ensign U S Naval Reserve in charge of Office of Naval Intelligence, Rockland, Me., 1917 1918 Aide to the Commandant, U S Naval Air Station, Chatham, Mass, 1918 1919

Member American Society of Mechanical Engineers (j); Society of Automotive Engineers (a), Providence Engineering Society; Boston Chamber of Commerce American Legion Military Order of the World War Naval Order of the United States U S Naval Institute National Aeronautic Association Engineers (Boston) Wardroom (Boston), Economic (Boston); Aero of Massachusetts (Boston) Aero of New England (Boston); Aero of Maine, (Portland) Corinthian Yacht (Marblehead) Woodland Golf (Auburndale); Marlborough Country (Marlborough) Technology (Providence)

Present Occupation President and director of A I D Incorporated Developmental Engineers

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Earl Dodge Osborn

OSBORN, EARL DODGE Publishing born Garrison N Y, Sept 2, 1893; son of William Church Osborn and Alice C H (Dodge) Osborn

Educated Princeton A B 15

Professional 1918 1920, Investments Roosevelt and Son

Aeronautical Activities 1920 to 1923 Asst Treas., Aeromarine Airways, Inc 1924 to date on staff of Aviation had metal hulled tractor flying boat built for personal use in 1924

Flying Rating Flying boat.

War Service American Ambulance Commission for Relief in Belgium 1915 to 1917 U S Infantry 1918-1919

Honors Croix de Guerre French Aug 1917

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Present Occupation Vice-Pres. Gardner Publishing Co

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Ray Page

PAGE RAY Airplane Manufacturer born Friend Neb Aug 19 1882 son of Lyman H Page and Harriett (Moon) Page, married Ethel Schmitz, Feb 20 1924

Educated Graded Schools, Friend High School

Professional Nebraska farmer 1900 to 1907 advertising auctioneer 1907 to 1919 salesman Nebraska Buick Co. 1919 to 1920 Mgr Nebraska Aircraft Corp 1921 1922 Pres Lincoln Standard Aircraft Corp. 1922 to date

Present Occupation Pres. Lincoln Standard Aircraft Corp

Address 2409 O Street Lincoln Nebraska home 2032 Sewell St Lincoln Nebraska

Earl S. Daugherty

DAUGHERTY, EARL S Commercial Aviation born, Des Moines Iowa, April 4, 1887, son of Chas J Daugherty and Mary A (Jones) Daugherty; married, Catherine Hall, Sept. 7 1923

Educated Public Schools Long Beach, Calif.

Professional: Banking 1905 to 1906 Photographer 1906 to 1909

Aeronautical Activities Started flying June 6 1911 Pilot Aeronautical Society, Nov 19 1911 to Nov 25 1919 Exhibition work Feb 12 1912 to June 8, 1912 Illinois Aero Const Co., July 31, 1912 to Oct. 26 1912 Sloane School, Nov 29 1912 to Feb 2 1913 Exhibition work, July 31 1913 to Aug 28 1915 Sig Corps Aviation School, June 26 1916 to Aug 2 1916 Exhibition Work, Aug 3, 1916 to July 4 1917 Sig Corps Aviation School July 6 1917 to Sept 6 1919 Air Service Sept. 19, 1918 to March 6 1919 Daugherty School of Aviation Long Beach, Cal. June 9 1919 to date Has carried over 15 000 passengers and had 4 400 hours flying time

Flying Rating Dec. 23, 1911 F A I Pilot's license No 87 R M A Sept. 16, 1918

War Service Civilian Flying Instructor Sig Corps Aviation School San Diego and 2nd Lieut, R M A. flying instructor at March Field, Cal, July 6 1917 to March 6 1919

Member N A A Commercial Aircraft Assn, So Calif Aero Club Long Beach Pacific Coast Club Virginia Country Club Los Serranos Country Club Elks Club A L; California Yacht Club

Present Occupation Daugherty School of Aviation and Flying Field.

Business Address 2455 American Ave, Long Beach, Calif; home The Terry Apts., Long Beach, Calif

Richard Henry Depew, Jr.

DEPEW RICHARD HENRY, Jr Aviator, born Plainfield N. J. May 20 1892 son of Richard Henry Depew and Elizabeth Gilmore (Drayton) Depew

Educated Taft School Sibley College of Engineering Cornell University 1909 to 1911

Professional Cattle Ranching 1915 to 1917; See below

Aeronautical Activities 1909 Charter member Cornell Aero Club 1911, built gliders 1911 learned to fly at Farman School Buc France 1911 to 1917 student of aeronautics 1917 Engineering Dept Curtiss Aeroplane and Motor Corp 1918 flying instructor and test pilot for Caribe Exhibition Co 1919 to 1922 in charge Curtiss Aviation School Mineola 1922 1923 Argentine Manager Curtiss Aeroplane Export Corp; 1923 to date manager of Flying Division and pilot Fairchild Aerial Camera Corp. Vice-Pres in charge of Flying

Flying Rating: Aviators Certificate 641 Aero Club of France Oct. 1911; Expert aviator s Cert A C of A 1918 R M A

War Service Test pilot, Air Service with rank of Captain McCook Field 1918

Member N A. A A C C; Cornell Society of Engineers American Radio Relay League American Legion

Present Occupation Vice-Pres Fairchild Flying Corporation

Address 136 W 52 St. New York City home 3 Cranford St Forest Hills L I

Edward B. Heath

HEATH EDWARD B Airplane manufacturer, born Brooklyn N Y Nov 17 1888 son of Charles Cochran Heath and Ada May (Johnston) Heath married Berna A Stephan April 19 1914

Educated Lincoln School N D High School 1907

Professional Airplane Mfg. business since 1904

Aeronautical Activities First flew home built plane at Amherst N Y Oct 1909 Also at Pecos and Ticonderoga N Y

Flying Rating F A I License, 5154

Member N A A

Present Occupation President, Heath Airplane Co Inc

Address 2856 Broadway Chicago Ill home, 633 Fullerton Parkway, Chicago, Ill

Some Fatigue Tests on Non-Ferrous Metals

A very interesting paper entitled "Some Fatigue Tests on Non-Ferrous Metals,"[1] by R. R. Moore, was read at the Twenty-eighth Annual Meeting of the American Society for Testing Materials at Atlantic City. In this paper are given the results of tests on non-ferrous metals to determine their endurance limits when subjected to alternating stresses of tension and compression, produced by the rotating beam method. The data given represent some results of an investigation of the fatigue of non-ferrous metals which is being conducted at the Engineering Division, U. S. Air Service, as part of a general investigation into the applicability of metals to aircraft construction. The tests were run in the Physical Testing Laboratory of the Engineering Division, at McCook Field, Dayton, Ohio. The following are some extracts from Mr. Moore's paper:

The ratios of endurance limit to other physical properties are quite variable. The ratio of endurance limit to tensile strength, which is about 0.50 for most ferrous metals, is evidently much lower for the non-ferrous metals. The ratio for magnesium is very low, while the ratio for aluminum approaches that of the ferrous metals. It is interesting to note that the ratio for the magnesium-aluminum alloy is very much higher than the ratio for pure magnesium even though the alloy is mostly magnesium. The addition of 8.5 per cent of aluminum evidently enhances this ratio considerably.

To the designer of airplanes weight is a vital consideration. It is also a matter of great importance in the construction of equipment for other modes of transportation. The advantages of light, durable construction will be recognized by builders and users of automobiles, freight cars, shipping containers, etc. The reduction of useless excess weight means a reduction in operating and maintenance costs and an increase in live-load carrying capacities. It is most interesting, therefore, to compare the endurance limit with the specific gravity of the metal. Such a relation might be called the "endurance-weight efficiency." The forged light alloy gives an efficiency of 8.40, which is greater then that of any of the other metals listed and is about 1.75 times as great as the efficiency of either of its components. Attention is directed to the extremely low endurance-weight efficiency of naval brass. The author has given elsewhere the results of some tests on electron metal (a magnesium-zinc alloy) and duralumin. The endurance-weight efficiency for electron is 9.56, which is higher than that of the magnesium-aluminum alloy given here. Duralumin, based on an endurance limit of 14,000 lb. per sq. in., would have an efficiency of 5.0, so that in this respect it is clearly much inferior to the magnesium-aluminum alloy and especially to the magnesium-zinc alloy.

Endurance-Weight Efficiency of Various Metals
Endurance-Weight Efficiency is Ratio of Endurance Limit to Specific Gravity x 1000.

Non-Ferrous—Light	
Aluminum (Rolled)	4.76
Magnesium (Extruded)	4.51
Mg Base + or — 4 per cent Al — ¼ per cent Mn (Extruded)	8.48
Mg Base + 6.5 per cent Al — ¼ per cent Mn (Extruded)	8.32
Mg Base + 8.5 per cent Al (Forged)	8.40
Mg Base + 8.5 per cent Al (Cast)	8.93
Mg Base + 10 per cent Cu (Extruded)	5.73
Mg Base + 4.5 per cent Zn (Extruded)	6.58
Duralumin (Rolled)	5.0
Non Ferrous—Heavy	
Aluminum Bronze Heat Treated (Extruded)	4.50
Aluminum Bronze (Cast)	2.60
Aluminum Bronze Heat Treated (Cast)	3.44
Manganese Bronze (Cast)	2.08
Naval Brass	2.40
Ferrous	
Plain Carbon Steel (Cold Drawn)[1]	4.59
3.5 per cent Nickel (Cold Drawn)[2]	6.12
1.20 per cent Carbon Steel[3]	13.65
3.5 per cent Nickel Steel[4]	15.30

[1] Tensile strength about 75,000 lb./sq. in.
[2] Tensile strength about 100,000 lb./sq. in.
[3] Heat treated to tensile strength of 224,000 lb./sq. in.
[4] Heat treated to tensile strength of 294,000 lb./sq. in.

In the accompanying table are given some comparisons of the endurance-weight efficiencies of various metals. All the heavy non-ferrous metals show quite low efficiencies. Some very interesting points are brought out by comparing the light alloys with the steels. A plain cold-drawn carbon steel with a tensile strength of about 75,000 lb. per sq. in. has a ratio of about 4.59. This is not quite as good as duralumin and very much below the magnesium-aluminum alloys. A cold-drawn 3.5 per cent nickel steel (S.A.E. No. 2330), which might run about 100,000 lb. per sq. in. tensile strength, has a value of 6.12. This is better than duralumin but still not as good as the magnesium-aluminum alloy. A 1.20 per cent carbon steel, heat-treated to a tensile strength of 224,000 lb. per sq. in., has a value of 13.65. This is much better than any of the light alloys. A 3.5 per cent nickel steel, heat-treated to a tensile strength of 294,000 lb. per sq. in., has a ratio of 15.30. It is evident, therefore, that plain carbon or a cold-rolled alloy steel is not as efficient as some light alloys, but by heat treatment the alloy of high-carbon steels will yield a much greater efficiency.

It has been quite firmly established by H. F. Moore that there is a stress or range of stress at which the wrought ferrous metals have an exceedingly long life, probably indefinitely long. He has further shown from a large volume of careful tests that a steel specimen which will withstand 10,000,000 reversals of stress will have an exceedingly long life. Therefore, on steels the knee of endurance curve is reached at or before 10,000,000 reversals. Data from tests on non-ferrous metals show that this latter conclusion cannot be applied to all non-ferrous metals. The results of tests by different investigators indicate that in some cases a definite endurance limit is obtained below 10,000,000 reversals. In other cases, namely, nickel, monel metal, and duralumin, no endurance limit is obtained even at 300 and 400 million reversals. In still other cases, endurance limits are obtained between 10 and 100 million reversals.

The results of tests run in this laboratory on duralumin which indicated that this light alloy did not approach its endurance limit below 400,000,000 reversals of stress, led to some long-time tests on the extruded magnesium alloys. It will be seen that these tests have run to 600,000,000 reversals. From the shape of the curves and the length of the test it appears that the specimens have reached an endurance limit or at least that they are going to have an exceedingly long life. These long-time tests are evidence that some non-ferrous metals may have an endurance limit as definite as is found with steels. A similar conclusion has also been reached by McAdam.

The high endurance-weight efficiency of the light alloys makes their use very desirable for many types of construction. The endurance-weight efficiency of course is not the sole basis for selection of a material. The comparative cost of the heat treatment of steels and the price of the non-ferrous alloys is an important consideration. Such initial cost, however, would be offset by lower maintenance costs, longer life, and higher live load carrying capacities. Another point to be considered is that light metals require larger cross-sections due to lower allowable working stresses. These larger cross-sections in turn offer greater stiffness to bending and torsional deformation due to the larger section modulus. On the other hand, the lower modulus of elasticity of the light alloys affects this stiffness adversely. The selection of materials is a careful balancing of the factors mentioned above and many others depending upon the special use to which the part is put.

1. The ratio of endurance limit to proportional limit and tensile strength for non-ferrous metals is quite erratic.

2. On a weight basis some light alloys are more efficient as regards endurance properties than either cold-rolled plain carbon or alloy steels but not as efficient as some heat-treated alloy steels.

3. The light alloys do not appear to respond to "coaxing" as readily as do the steels.

4. The magnesium-aluminum alloy "as cast" gives a relatively high endurance limit compared to that of the same metal forged.

5. The reduction of endurance limit due to concentrated stresses caused by a notch is not as severe on the cast light alloy as on the forged light alloy. Specimens of pure magnesium and aluminum are affected more than the alloy of both. The notch effect seems to be independent of elongation.

6. Long-time tests (600,000,000 reversals) indicate that some extruded magnesium-aluminum alloys have a definite endurance limit.

7. Designers should know the values for endurance limits of non-ferrous metals when these metals are to be used as primary members for the endurance limit is often found to be very low.

Dodge Buys 2592 OX5 Engines

All Surplus OX5s Sold by Air Service To Be Used in Motor Boats

All the surplus OX5 engines remaining on hand in the Air Service have been sold by public auction. There were 160 bidders for the 2800 engines and they were were awarded to 14 bidders. Quantities of spare parts and tools for Curtiss OX5 engines located at the Fairfield Air Intermediate Depot, Fairfield, Ohio, and the Rockwell Air Intermediate Depot, Coronado, Calif., were included without extra charge to the purchaser taking all or the bulk of this type of engine. The bulk of the engines were in storage at the Little Rock Air Intermediate Depot.

2592	Curtiss OX5 engines,	90 hp	@	$80.26
5	" "	90 hp.	@	80.00
10	" "		@	105.00
1	Curtiss OX5 engine,		@	100.00
1	" "		@	100.00
10	Curtiss OX5 engines,		@	80.00
170	" "		@	78.57
12	" "	90 hp.	@	61.00
1	Curtiss OX5 engine,	90 hp	@	75.00
1	Mercedes engine,	180 hp	@	113.00
1	" "		@	103.00
1	B.M.W. engine	185 hp	@	555.00
3	LeRhone rotary engines	120 hp.	@	10.00
76079	Spark plugs Beth "Punsol" All bids rejected			
125	Magnetos various types, for lot,			300.00

Horace Dodge is one of the Directors of Dodge Brothers, the automobile manufacturers of Detroit. He is also interested in the construction of speed motor boats. These boats have used the OX5 engines with success and it is believed that many will be used in this way. The possibility of their use in a new type of airplane by Mr. Dodge could not be confirmed.

The awards were as follows

Horace E. Dodge,	Detroit, Mich.
Charles F. Stuart	Portland, Ore.
L. L. Adcox,	Portland, Ore.
50-50 Auto Exchange,	San Diego, Calif.
W. W. Bird,	San Diego, Calif.
Lawrence M. Allison,	Lawrence, Kans.
H. Kleff	Baltimore, Md.
Shank-McMullen Aircraft Co.,	Huntington, West Va.
C. O. Fell,	San Antonio, Tex.
E. C. Bairstow,	Washington, D. C.
Air Transport Equipment Co.,	Long Island City, N. Y.
H. V. Shebat,	Syracuse, N. Y.
Robert W. Duff,	Castlewood, Va.
Joseph Marquis	Buffalo, N. Y.

Air Transport Costs

Recently there have appeared in newspapers what purport to be the cost to the Ford Company of air transport of freight. Enquiry as to the reliability of these costs showed that the figures were neither authentic nor authorized and as yet no attempt has been made to prepare cost data.

As there is a tendency by newspapers to take the cost of oil and gas, divide it by the mileage and give the public an impression that the result is the cost, much misleading information is spread regarding air transport operating expense.

When the public is asked to pay a fair price for air transport service and this cost exceeds by many times these newspaper costs, the charge will be made that the prices are excessive.

So that the many items that should be properly included in any price fixing schedule will be known, the following list has been prepared. While it does not attempt to cover all possible charges, it could be used to check up any estimates that are made or figures made public.

Items Making up Air Transport Costs

Capital Charges

- Organization Expense
- Furniture and fixtures
  - Executive offices
  - Field offices
- Engineering surveys
- Real estate
  - Terminals
  - Emergency fields
- Field Grading drainage water supply, roads, etc.

Buildings
- Office
- Dwellings
- Hangars
- Shops
- Garage
- Warehouse
- Fuel houses

Facilities
- Lights
- Heating
- Power
- Tel. and Tel.
- Radio
- Meteorological
- Beacons
- Fire equipment

Flying Equipment
- Aircraft
- Engines
- Instruments and radio
- Engine and aircraft parts

Ground Equipment
- Shop equipment
- Engine test stand
- Tractors
- Automobiles
- Trucks
- Delivery wagons

Operating Charges

Administration
- Rentals
- Executive salaries
- Engineering salaries
- Clerical salaries
- Sales salaries
- Legal expense
- Sales expense (advertising)
- Telephone and telegraph
- Taxes
- Petty miscellaneous

Operation
- Rentals
- Wages
- Officials
- Clerks
- Pilots
- Engineers
- Radiomen
- Mechanics
- Labor
- Watchman

Gasoline oil grease

Motor transport

Insurance
- Fire
- Accident
- Property damage
- Personal liability
- Employees liability
- Freight loss

Depreciation (replacement)
- Buildings
- Aircraft
- Engines
- Accessories
- Machinery
- Motor transport
- Radio
- Beacons

Heat power and light (beacons)

Telephone and telegraph

Upkeep paint and repair, regrading

Travelling expense

Clutches and Transmissions for the RS-1

Description of the Twin Disc Clutch Co.'s Friction Clutches and Gears for the Airship RS-1 Built by the Goodyear Tire and Rubber Co.

In 1921 the Twin Disc Clutch Co. of Racine, Wis., designed and built for the Goodyear Tire and Rubber Co. two 150 hp aircraft clutches for use in the Army airship AC-1 This design was described in AVIATION for Jan. 23, 1922. These clutches have had some 400 hr. service without requiring any attention. With the experience gained in this and other designs the Twin Disc Company have designed and manufactured two new units, for 450 hp. this time. The first of these units is a friction clutch for the Liberty 12 engine The other is a transmission unit for two Liberty engines employing two of these clutches.

The clutch is manually operated and may be engaged or disengaged while engines are operating at any desired speed The toggle levers of clutch are thrown slightly over center when the clutch is engaged; this action gives a frictional capacity between the clutch plates more than sufficient to take care of the full engine torque To disengage the clutch the toggle levers are thrown over center in the opposite direction. There are no springs in the clutch with the exception of six light springs which separate the plates when the clutch is disengaged This construction entirely eliminates any possible end thrust against the crankshaft bearings The clutch will stay in either the engaged or disengaged position with no chance for the clutch to engage when engagement is not desired

One interesting and patented feature of this clutch is its simple and quick means for adjustment, which is by the adjusting pin clearly shown in Fig 1 It is only necessary to pull out this pin to a stop and then turn one twelfth turn or more as may be necessary. This may be accomplished in a few seconds without the use of tools The clutch yoke assembly will turn as a complete unit, the yoke being threaded to the clutch hub, a sixteen pitch thread being used

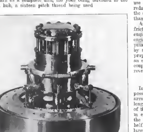


Fig. 1 Friction clutch used in the airship transmission unit built by the Twin Disc Clutch Co of Racine, Wis

This clutch, like all Twin Disc Clutches, will pick up either light or heavy loads without any tendency toward jerking, and will maintain this fine quality of smooth and quiet operation throughout the life of the clutch.

The engine fly wheel which is designed to fit the standard Liberty crankshaft, is a one piece forging, having internal gear teeth which drive the clutch plates. All the clutch plates, except the two outer which are duralumin forgings, are made of the highest grade saw blade steel, with copper asbestos woven discs riveted to the driven discs. Two of the asbestos discs are riveted to the duraluminum discs to prevent frictional contact directly against the duralumin plates. A case hardened ring is inserted into the outer duralumin plate to provide a suitable bearing for the clutch levers against this plate. Practically all parts of the clutch which are not of duralumin are chrome vanadium forgings, no castings being used. The small toggle levers are drop forged nickel steel.

In the clutch hub are mounted two SKF ball bearings, which allows the clutch as a complete assembly to be mounted on the fly wheel hub extension, directly over the taper end of the crankshaft. When locked in position the inner races of bearings are fixed to the shaft against rotation. The capacity of this clutch is 450 hp. working load at 1750 r.p.m., 550 hp. maximum capacity at 1800 r p m

Transmission Units

These clutches are used in the transmissions (Fig 2) designed especially for use in the RS-1 semi-rigid airship now nearing completion at the Goodyear Tire & Rubber Co of Akron. The RS-1 is to have two power cars, each equipped with two Liberty 12A engines driving a 17½ ft. propeller through reduction gears

The purpose of the transmission is that a larger diameter and slower speed propeller is most efficient From 15 per cent to 20 per cent greater cruising radius is obtained by the use of the larger type slow speed propellers driven through reduction gears than by mounting the propellers directly upon the engine crankshaft. By the use of a reduction gear more than one engine may readily be used for driving one propeller

As designed for the RS-1, each engine is equipped with a friction clutch which enables the operator to disengage either engine at any instant. Additional means for disengaging the engines from the transmission unit is provided—at one drive pinion with a gear tooth dog clutch and at the other pinion by shifting the reverse lever to neutral position Thus the propeller may be driven by either one of the engines in case an engine is disabled without rotating the clutch and flexible couplings of the other engine One engine only is used for reversing while negotiating a landing.

Engines Staggered

In order to have the driving pinions as close together as possible, one of the engines is set forward of the other This arrangement permits the use of a drive tube of considerable length for the engine which is connected to the reverse side of the transmission When driving forward, the drive tube is in exact alignment with the drive pinion. When in reverse, the drive tube operates on an angle of approximately one-half of one degree which is easily taken care of by the two large non-metallic flexible couplings used between the clutches and drive pinions

The gear case housing and oil sump are made of heat treated aluminum alloy casting Cooling ribs are cast on the oil sump for cooling purposes. The oil sump is of approximately 2 gal. capacity A forged duralumin gear pump is used in the oil sump to carry oil to the transmission gears. The propeller shaft is a one piece alloy steel forging having a flange forged integral with the shaft to give the lightest possible weight and simplicity The end propeller flange is of a duralumin forging A brake is provided on the propeller shaft for stopping the propeller Oil which is provided for the gears of the transmission does not enter this compartment of the transmission.

All gears in the transmission with the exception of the duralumin lubricating gear pump have ground gear teeth which make the gears uniform as well as exceptionally quiet Both drive pinions are forged integral with the shafts which insuring maximum strength, perfect concentricity of pinions and lightest possible weight. The pinion extensions which project through the housing have sixteen splines upon which a driving member operates. These splines are ground to exact size and the large number of splines reduces the unit pressure to a minimum.

Eight SKF single row ball bearings are used in each transmission, the bearing next to the propeller carrying both the radial and thrust load of the propeller. By loosening the nuts of the cap which holds this bearing in place, the propeller shaft and bearing may be removed from the transmission unit in the same manner as a drive shaft is removed from a full floating motor car axle

The transmission (as shown in Fig 2) complete less oil weighs 425 lb

After a 50 hr. endurance test conducted by the Air Service at McCook Field, this transmission showed no undue wear of any of its parts

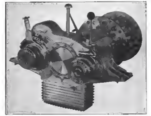


Fig 2 Transmission unit connecting two Liberty 12 engines to a single propeller shaft developed by the Twin Disc Clutch Co of Racine, Wisc

Interference Tests on an N.A.C.A, Pitot Tube

N.A.C.A Report No 199

In connection with the standardization of instruments used in the wind tunnel, this investigation was undertaken by Elliott G Reid at Langley Memorial Aeronautical Laboratory, to determine the nature and magnitude of the errors inherent in the measurement of air speed by a Pitot tube when the instrument is mounted close to some other body The mounting of the instrument in proximity to some other body is so frequent in flight and in wind tunnel research that it seemed advisable to investigate thoroughly the magnitude of the possible errors caused by such proximity. The results of this investigation will facilitate comparisons of the errors due to interference which have been reduced to percentages of the air-speed readings obtained under conditions of no interference

A copy of Report No 199 may be obtained upon request from the National Advisory Committee for Aeronautics, Washington, D C

1924 Aircraft Exports Nearly Double*

Although still comprising only a very small portion of the total shipments of automotive products from the United States, aircraft exports in 1924 were almost double those of 1923. Their value was $798,273,[1] or $384,715 more than in 1923, and the number of planes exported exceeded those of the previous year by 10

The year 1920 still stands as the record maker in shipments of airplanes and seaplanes, but 1924 approached it more closely than any other year. Since the beginning of 1922 there has been a steady increase in the number of planes exported, as well as in the total value of all aircraft products. There is every indication that this increase will continue

The promising showing made in aircraft export trade last year, however, falls into its true position in the picture of automotive exports when compared with the gross total for the year Exports of all automotive products in 1924 were valued at $220,900,808, and of this total sum aircraft shipments made up only 0 0036 per cent

The following tables summarize the postwar trend of exports in all aircraft products and show the comparative status in 1913:

EXPORTS OF AIRCRAFT PRODUCTS FROM THE UNITED STATES, 1913, 1918-1924

Calendar year	Aircraft and seaplanes Number	Aircraft and seaplanes Value	Other aircraft Number	Other aircraft Value	Aircraft parts except engines and tires Pounds	Aircraft parts except engines and tires Value	Aircraft engines Number	Aircraft engines Value
1913	20	$81,750	(1)	(1)	(2)	$25,802	(3)	(3)
1918	49	607,255	(1)	(1)	(2)	14,670,269	(3)	(3)
1919	44	218,300	(1)	(1)	(2)	6,240,226	(3)	(3)
1920	65	598,274	(1)	(1)	(2)	594,979	(3)	(3)
1921	48	914,940	(1)	(1)	(2)	157,608	(3)	(3)
1922	37	158,630	(1)	(1)	471,489	285,481	147	$72,818
1923	48	308,151	2	$600	275,275	58,949	80	65,558
1924	56	411,458	3	1,280	165,470	165,926	149	219,609

[1] No aircraft other than airplanes and seaplanes were exported prior to 1923
[2] Statistics not shown in pounds prior to 1922
[3] Not separated from other internal-combustion engines prior to 1922.

The following tables show the exports of all aircraft products during 1924, with countries of destination. Latin American countries absorbed over 80 per cent of the total value of 1924 aircraft exports Mexico leads as the market for planes, as it did during the year 1922 when it received 22 planes valued at $19,600 In 1923 Mexico surrendered first place to Brazil, taking only 4 planes valued at $5,700, whereas Brazil took 13 valued at $229,200

A significant feature of the following figures is the number of engines exported to the Netherlands and Russia and the disparity in their respective values. The 58 shipped to the Netherlands had an average value of $1,158, but the 27 sent to Russia averaged only $300 in value. This difference is probably accounted for by the fact that the Netherlands is a market for up-to-date high-powered engines for use in planes of their own manufacture, while Russia is buying cheaper engines adaptable for other uses than as aircraft power

An indication of Japan's growing interest in aviation is shown by the fact that it received parts for aircraft, second only to Mexico in both weight and value. The four engines which Japan bought were of good quality, if the average value of $2,500 be taken as a criterion

Country of destination	Quantity Number	Value
Airplanes and seaplanes		
Mexico	16	$190,800
Argentina	16	51,675
England	6	64,250
Brazil	4	37,095
Chile	4	12,870
Peru	4	65,105
Cuba	3	28,000
Norway	1	20,000
Honduras	1	5,162
Nicaragua	1	1,500
Canada	1	800
Total	56	411,458
Other aircraft		
Canada	2	1,000
Mexico	1	280
Total	3	1,280
Engines for aircraft		
Netherlands	58	67,170
Russia in Europe	27	8,100
Peru	16	16,359
Canada	11	10,050
Brazil	7	10,068
England	6	42,250
Argentina	4	1,180
Japan	4	10,000
Salvador	2	4,500
Italy	2	22,000
France	1	11,000
Germany	1	11,000
Honduras	1	6,005
Mexico	1	800
Barbados	1	875
Cuba	1	1,500
Australia	1	210
New Zealand	1	650
Total	146	219,609
Airplane parts, except engines and tires	Pounds	
Mexico	65,736	77,840
Japan	58,181	36,597
Brazil	17,844	12,210
Canada	15,617	10,618
Argentina	6,531	5,128
Siam	4,442	1,497
Netherlands	6,406	4,458
Cuba	5,207	1,420
Salvador	2,900	1,600
China	2,142	4,588
France	1,819	3,100
Russia in Europe	1,200	500
England	769	6,900
New Zealand	650	950
Honduras	331	389
Colombia	613	1,084
Australia	126	180
Italy	82	718
Nicaragua	50	60
Trinidad and Tobago	48	68
Chile	20	12
Total	165,472	165,926

*Report of Dept. of Commerce.

AIRPORTS AND AIRWAYS

Pittsburgh, Pa.
By Ray A Tucker

Rodgers Field, the Pittsburgh municipal airdrome, became a reality last week upon the completion of the grading operations. It is a two-way field of 40 acres, owned jointly by the city of Pittsburgh and the county of Allegheny. It is also an Army Reserve Training Field, the Government having already constructed two all-steel hangars and fueling station at an expense of $60,000. Contracts have already been let for the construction of an administration building and the work will be started immediately. Three government Jennys with Model E, 180 hp Wright engines from Fairfield, Ohio, have already been delivered and more are due to arrive shortly. Lieut Royal B Lea has been placed in charge of the field and Lieut Robert H. Hancock, A.S.-O.R.C, in charge of maintenance.

On Friday, June 5, Lieut Earl S. Hoag, with Col Harry C Fry, Jr, as passenger, flew from Bolling Field in 2 hr 20 min in a DH, the first Army ship to land on Rodgers Field. Lieutenant Hoag is stationed in the office of Chief of Air Service and is well known in this city, and Colonel Fry is a member of the Aero Club of Pittsburgh and Chamber of Commerce. Large delegations from each organization greeted them upon their arrival, including H. Stewart Dunn, Asst. City Solicitor, and Harry Speaker, the Mayor's secretary, representing Mayor Magee.

J Dalzell McKee, a member of the Aero Club, has just purchased a new Curtiss Hawk with a 575 hp, CD-12 engine, and flew it here from Bolling Field on Sunday morning, June 7, returning the following morning. This makes eighteen ships owned by Aero Club members.

Capt. Chas. H. Phillips, air officer at Third Corps Area Headquarters, Baltimore, Md, and Sgt. C. L. McNary as observer, also flew in from Logan Field last week to confer with Lieutenant Lea on the subject of Army Reserve equipment and training program.

Lewis F. Sevier has been made manager of Mayer's Aircraft Corp of Bridgeville and is planning a busy summer in commercial work.

Wm. T. Richmond of Homestead has purchased a three passenger Lincoln Standard ship with a 150 hp Hisso engine. He has employed Romer Weyant as his pilot and will engage in the business of passenger carrying.

Twenty-three local Reserve pilots took the two weeks summer training at Langley Field last year and from all indications a larger number will be reporting on July 5 this year.

Spokane, Wash.
By E. H. Partridge

Nineteen officers and 72 men gathered here the last two weeks in June to attend the maneuvers of the 116th Observation Unit of the Washington National Guard in annual encampment. The officers kept four ships in the air almost continuously and every private in the squadron was given a ride which included stunting.

The encampment at Earl Hoisington Field, Parkwater, was the first in which the aerial unit has participated, as the organization came into being the first of this year. Maj. Jack Fancher was in charge. Maj. Gen. Maurice Thompson, head of the state guard, was one of the military visitors and he took a ride in the air. Lieuts. Tom Symons, Nick Mamer, Ed Axborg, Major Fancher and Lieut. George Henry did most of the piloting.

Governor Roland H. Hartley, of Washington, viewed Spokane from the air on his first airplane ride early in June. He said flying was "the thrill of his life."

Pilot Mamer has sold one of his Standard ships and recently received a new set of wings for another 150 hp Standard plane.

Tulsa, Okla.

New types of commercial airplanes now being developed are expected to be brought together for comparison and competition in the aerial exposition and field meet to be held in Tulsa, Okla., Aug. 30 to Sept. 4, in connection with the national encampment of Veterans of Foreign Wars. The air meet is being planned under the auspices of the Tulsa chapter, N.A.A. The program will include races, stunt contests, the usual exhibitions and demonstrations of military aircraft.

Cash prizes and trophies valued at near $10,000 are to be offered contestants. Classes for competing pilots as well as competing planes will be scheduled.

A re-union of former A.E.F. pilots with foreign service will be held during the week. Special prizes will be offered the former A.E.F. pilots.

The fact that Tulsa is the business center of the rich mid-continent oil field, and one of the most active flying regions of the country, insures a record number of planes for the meet, which the Tulsans declare will be the most elaborate ever staged in the southwest. A main landing field of 120 acres, with an auxiliary field of 100 acres and another of 160 acres, all adjoining each other, will provide an ample setting for the meet.

Details of the meet are in charge of Duncan A. McIntyre and Harrison R. Tucker, both of whom are active pilots. They are promising a show which both Army and civilian pilots will vote a success. Special leave will be granted Army officers and pilots who wish to attend the V.F.W. convention, officials of the organization have been advised.

Dayton, Ohio
By Maurice C. Hutton

Well, the boys did it. Not so very long ago we made the rounds vociferously complaining that if things did not liven up pretty soon, aeronautical reporters on Dayton papers would become about as useful as brakemen on the Ford air line. But now we are willing to haul up the white flag. Things are happening so fast and furious like that we can't keep up with them.

The first project to come to light after our complaint—the complaint was a mere coincidence of course—was for Al Johnson to announce the opening of an air line for passengers between Dayton and Cincinnati.

Al is an enterprising fellow and always goes through with what he starts, so he had the fullest cooperation of newspapers and city officials from the first. Mayor Frank B. Hale, Dayton's famous "flying mayor," and Congressman Roy O. Fitzgerald of the Third District Ohio, were invited to make the initial trip. And they were there on the dot for the start.

Smiling Jack Loess went down ahead of the official party taking Bill Mayfield, the movie cameraman, along. Clyde Emerick managed "Big Boy," the five-passenger Liberty job in which Mayor Hale, Congressman Fitzgerald, and Bernard Losh, of the *News*, made the trip. The writer trailed along with Al Johnson and Perry Hutton in a Swallow which the latter had just flown in from Wichita, Kans.

Mayor George Carrell of Cincinnati was waiting at the Lunken airport in Cincinnati with John Pattison, vice president and secretary of the Grisard company, Hugh Watson and Paul Riddle who have commercial rights to the field, and Paul and Dixie Davis. The 120 mi round trip, with time for ceremonies thrown in, was completed in about 3 hr.

Five round trips are scheduled to be made daily. The price for the round trip is $25, or $20 one way. The Mayor of Piqua, a small community near Dayton, was one of the early patrons.

Hardly had this slipped from the front pages before a "penny a pound" policy was adopted for four days. Then things did begin to hum. Big ones, little ones, tall ones, short ones, thin ones, fat ones, men, women and children! Without an end they came stringing down the pike keeping the three pilots at the stick from morning until dark. You may think this is an exaggeration, but it is not. Johnson's Flying Service, Inc., has the report to back it up. Fifty-one tons of passengers, or to be exact, 102,025 lb., were carried during the four days. The number was 1,028 passengers.

Attention in the meantime had shifted to South Field operated by Howard Rinehart and B. L. Whalen. The firm has leased the commercial rights to Norton Field, Columbus, for eight years and keeps planes in readiness at all times for passenger service between Dayton and the state capital. Benny Whalen has been unusually successful with the Dayton end of the line this year with attractive air tours over the city which take in all the big sights—both of them.

Hal Emerick, whose business has grown steadily during the last four years, is coming along quietly at Avondale flying field, catching tourists as they arrive in Dayton, teaching students, and assembling his new job about which more will be said later.

The writer has just completed a very delightful if hurried trip around the edge of Lake Erie learning, among other things, that the Stout company is busy on five new monoplanes at the Ford airport, that E. M. Ronne is handling the Curtiss Field at Buffalo by himself this year, and that the best way to reach Glenn Martin's plant is by air.

Oh yeah! The Indianapolis speedway races looked like a reunion of fliers with everyone there from Eddie Rickenbacker on down.

Peoria, Ill.

Varney Airport, Peoria's municipal flying field, which is located about one mile north and a quarter mile west of the fair grounds (about four miles north and a half mile west from the center of the city) has been improved till it is now one of the best fields in the middle west. There are some rough spots, however, and visiting fliers should observe the following directions if they wish to use the best part of the field. The west side furnishes a run nearly half a mile long for north and south take-offs, with only a low phone line on the south and a low fence on the north. The north side of the field furnishes a run of over a quarter mile east and west, with only a low phone line on the west and a hedge on the east. A large wind cone is mounted on the hangar, which is located on the south east corner of the field. Gasoline, oil and supplies may always be had at a nominal charge. No charge is made for use of field by visiting fliers, who are always welcome.

There are four ships flying out of the field now, besides those operated by the Varney Aircraft Co. These ships belong to students who have completed their courses and are using the field as their base.

Recent windstorms wrecked a couple of Standards which were staked out on the field, but they have been rebuilt and are flying again.

One of Yackey's pilots was through the field recently flying a TM scout with OX5 engine. He was on his way to Hannibal, Mo., and dropped in to leave some wing covers for one of the students who is building an Avro.

Some of the local enthusiasts are talking of organizing a company and putting into production a light three place plane this fall.

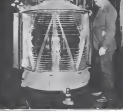
Ed Leininger will soon have his Avro finished and be ready to start for his home at Steamboat Springs, Col.

Russian Aviation Society Membership

A conference of the O.D.V.F. or Friends of Aviation Society, which has become a gigantic Soviet State organization was held May 15.

According to official figures, the O.D.V.F. has a membership of 225,000 persons, of whom 47 per cent are workmen and 30 per cent are officials who have contributed more than 7,000,000 gold rubles toward strengthening the Red air force.

The subscriptions consist mainly of a compulsory deduction from salaries and this has rendered the O.D.V.F. and other societies so unpopular that the Soviet Government has issued instructions to stop compulsory contributions even if membership dwindles. According to the Soviet press, the deductions nevertheless continue.



P & A Photo

One of the new B.B.T. Air Mail type one half billion candle power flood lighting lights which the B.B.T. Corporation of America of Philadelphia is supplying to the Air Mail for their flying fields from New York to Cheyenne, Wyo. The lamp is equipped with a General Electric Co. motion picture studio arc light mechanism. In a recent test of the lamp an area three quarters of a mile in extent was illuminated making visible objects three thousand feet away.

Argentine Aviation

The following table shows the aerial activities in Argentine for the year of 1924 and the latter part of the year 1923. These data show that our southern neighbors' interest in aeronautics is very rapidly increasing. It is noteworthy that the greatest amount of time is spent on instruction.

ACTIVITIES BY MONTHS

	1924		1923	
Months	Flights	Time	Flights	Time
Jan	111	32 h 58		
Feb	110	38 h 33		
March	210	87 h 21		
April	218	68 h 8		
May	302	95 h 40	14	4 h 5
June	312	135 h 40	150	44 h 16
July	487	124 h 42	53	17 h 4
Aug	503	188 h 28	70	25 h 38
Sept.	283	107 h 20	182	49 h 03
Oct	425	145 h 28	80	22 h 45
Nov	280	81 h 12	144	40 h 48
Dec	302	181 h 55	58	11 h 18
Total	3 758	1 206 h 28	718	213 h 48

ACTIVITIES BY LOCALITIES

	1924		1923	
Months	Flights	Time	Flights	Time
Centro de Aviacion Civil	303	118 h	289	87 h 53
Aero Club S. del Estero	677	185 h 03	231	71 h 41
Aero Club Chaco	853	215 h 41	198	54 h 15
Aero Club Tucuman	789	203 h 11		
Aero Club Dep Gral Guemes	78	28 h 53		
Aero Club Mendoza	880	222 h 41		
Aero Club Junin	290	32 h 23		
Aero Club Las Flores	419	172 h 28		
Total	3 788	1,206 h 28	718	213 h 48

ACTIVITIES BY CLASSES

	1924		1923	
Months	Flights	Time	Flights	Time
Tests of Airplanes	200	84 h 38	88	14 h 55
Instruction	1 660	464 h 20	590	178 h 54
Solo	719	241 h 08	3	8 h 5
Touring	757	142 h 02	12	5 h
Governmental	82	38 h 01	2	4 h 17
Cross-Country	284	252 h 20	25	2 h 37
Total	3,728	1 206 h 28	718	213 h 48

Note. In order to arrive at the total number of flights no count was taken of landings made during instruction or of landings made during solo flights.

FLYING SCHOOLS

Civil Aviation Center (Closed from February to November). Aero Club Junin. Aero Club Las Flores. Aero Club Mendoza. Aero Club Santiago del Estero. Aero Club Tucuman. Aero Club Chaco. Aero Club Deportivo Gral. Guemes. (Suspended during June.)

UNITED STATES AIR FORCES

U. S. ARMY AIR SERVICE

Line to Fly

Hon. Dwight F. Davis, Acting Secretary of War, has just approved a new and far-reaching policy which will afford an opportunity for Air Service training to Army officers of all combat branches. This change is prompted by aviation developments leading to a conclusion that all line officers require such knowledge of the capabilities and limitations of the Air Service, as to permit them using it under all conditions of battle, and to a feeling that the general efficiency of such officers will be increased by a limited amount of actual experience in the air. The policy contemplates that all line officers, in addition to theoretical instruction, will have an opportunity for at least ten hours actual experience in the air. While the first steps in initiating this policy will apply to juniors and a few field officers, the operation of this policy will in future years insure a majority of all combat officers having had this aerial experience.

In the first place, that part of the courses of instruction at the several service schools devoted to the Air Service, has been increased to an average of 60 hr. so as to allow more time for theoretical and demonstration instruction in the tactics and technic of the Air Service. At West Point this instruction will cover 90 hr, and at Leavenworth and The Army War College it will include even more. One officer of the Air Service is hereafter to take the company officers' course at each of the schools for Cavalry, Infantry, Field Artillery and Coast Artillery. One major or senior captain of each of the six other combatant arms of the service is to take the course at the Air Service Tactical School, Langley Field, Va.

While existing law prohibits in peace compulsory flying for other than aviators and aviation students, beginning with the year 1926 officers of other branches will be encouraged and given an opportunity to get aerial experience. Practical aerial experience will include at least 10 hr. in the air. Immediately after graduation leave, members of the West Point graduating class will be sent to an Air Service flying field, and there be afforded an opportunity for actual aerial experience. During their first fifteen years of commissioned service all officers, who have not had aerial experience after graduating from West Point, will be given an opportunity to have this experience in the air. Initially this opportunity will be given to all combatant officers now in the Army, who have been commissioned in the Regular Army since Nov. 11, 1918, and who were not either officers or cadets prior to that date. Moreover, student officers at the Command and General Staff School at Fort Leavenworth, Kans., will be afforded a similar opportunity. Naturally, no officer will be permitted to make flights unless he can pass a prescribed physical examination.

A Board of Officers, to be convened in the War Department, will prepare the courses of instruction to be followed at the various schools and flying fields as well as the detailed methods of putting this policy into effect.

Officers who have had aerial experience as indicated above, will be reported to the War Department as having attained this additional professional qualification. It may be necessary to secure legislation to provide either for flying pay or insurance for officers who engage in this work. Owing to the large number of officers in the Army, who will take this course, it is impracticable to give more than approximately 10 hr. aerial experience. However, the Chief of Air Service believes that such training will by practical experience give officers a considerably better acquaintance with Air Service problems.

This policy should increase the close cooperation so essential to all branches of the Army in battle. By the provisions of this policy Infantry, Cavalry, Artillery, other line officers and prospective General Staff Officers are brought into close association with Air Service problems and Air Service officers will learn how best to use their new arm to support the other arm.

In addition to the foregoing, the War Department has recently approved a change in the uniform for officers of the Air Service, so as eliminate the disadvantage of the present uniform for flying duty. The new Air Service uniform will have a coat with a low cut roll collar of civilian type, instead of the present high standing collar, embroidered collar and shoulder insignia, instead of present metal type, high lace boots or golf stockings for use when actually flying, and a soft cap of similar design to the overseas cap used by the A.E.F. during the War, all with a view to insuring maximum comfort and freedom of movement for the aviator.

Student Engineer Cross-Country

Members of the Air Service Engineering School at McCook Field, Dayton, Ohio, made an instructive cross-country flying trip in April. The first stop was made at Philadelphia, where the students were taken through the Naval Aircraft Factory. Here interest centered about the catapult apparatus. The second stop was made at the Air Mail Field at Bellefonte, Pa. The third and last stop was made at Buffalo, where the class visited the Curtiss factory and studied the latest machinery used in producing the D12 and V1400 engines. In Buffalo a study was also made of the production methods employed at the Consolidated Aircraft Corporation's plant, and a trip was taken through the factory of the Irving Airchute Co. The purpose of the trip was to obtain first-hand information in connection with a class problem covering the calculation, analysis and design of the 500 hp. Vee type engine.

Army Maps New York

The latest maps of the U. S. Geological Survey of several quadrangles in the vicinity of Albany, N. Y., were dated some 35 yr. ago, which is naturally considered antiquated. New cities have sprung up, automobile highways have been built, railroads re-routed and aviation fields established. To have performed the work of mapping this area in the customary way would have entailed considerable time, trouble and expense.

That the airplane has served to speed up life's daily routine in some quarters is beyond question. The U. S. Geological Survey had a big job before it, involving the mapping of about 1900 sq. mi. of territory. Just how long it would have required to complete this project by ordinary surveying methods is hard to calculate, nor is it an easy matter to estimate the expense which it would have entailed.

But the Army Air Service had cooperated on a number of previous occasions with the U. S. Geological Survey in connection with mapping projects, and, being once more called upon, completed this task in less than three weeks, the last of the five flights necessary to cover the ground being made on May 4. But for cloudy weather, this mission would have been accomplished much sooner.

Lieuts. E. G. Plank and E. P. Gaines, Air Service, left McCook Field, Dayton, Ohio, in the Photographic plane DH4BPI, bound for Albany, on April 16. The plane was equipped with a T1 tri-lens camera. All photographs were made from an approximate altitude of 10,400 ft. over this 1900 sq. mi. area. One quadrangle, known as the Troy, was

desired to be done by the U. S. Geological Survey on an unusually large scale for experimental purpose.

During the trip Lieutenant Plank addressed the Kiwanis Club and Officers Reserve Club of Albany.

San Antonio A.I.D.

The Engineering Department at the San Antonio Air Intermediate Depot is under the direction of the Engineer Officer, Lieut. Clements McMullen, charged with the repair, restoration and remodeling of all Air Service equipment in use or storage at this Depot, and all other Air Service equipment received by the Depot when such work is needed. In addition, the Engineering Department manufactures such equipment, parts and tools as may be required for immediate use. The Engineering Department also reclaims all Air Service equipment which may be damaged beyond repairs. The Office Section of the Engineering Department is under the supervision of Hubert Smith, the Shop Section under Lieut. Richard Aldworth; and the Drafting Section under Wendel Muncy. The Shop Section is divided into the Aero Repair, under the supervision of Claire Horton, the Engine Repair under Elmer Briggs; the Machine Shop under Victor Myers, the Final Assembly under Claire Horton, Lubrications under L. H. MacKechnie and Reclamation under L. H. MacKechnie.

The Aero Repair department, which repairs, remodels and restores aircraft and its spare parts and manufactures such parts as may be authorized, includes such processes as dismantling, fuselage, wing, woodworking, landing gear and strut, propeller, fabric, wiring, dope and paint, instrument, vulcanizing, radio and engine installation.

The Depot Supply Officer, Lieut. John M. Clark, is having a dark room constructed for the storage of all rubber goods.

The Boeing Aircraft Co., of Seattle, Wash., have four of their employees here welding eighty metal DH4M1 fuselages.

A nine months' drought in this region was broken within the past few weeks by rains exceeding two and one half inches. Young farmers temporarily employed at nominal wages as laborers are leaving the employ of the Depot to go to their farms and put in crops of cotton and food stuffs. A sudden demand for laborers has therefore sprung up.

The Engineering Department completely overhauled and repaired the following airplanes and engines during March and April:

Airplanes: 40 DH4B; 3 DH4B1, 1 DH4B3, 1 VE9, 23 JN6H1, 1 TW3, 3 TW5, 1 TP1, 1 Fokker CO4, 1 AT1.

Engines: 82 Liberty 12A, 3 Wright A2, 34 Wright I, 8 Wright E, 1 Wright H, 3 Wright H3.

Army Air Orders

First Lt. Byron Goodes Cook, A.S.R., Lakewood, Ohio, to active duty McCook Field, reverting to inactive status June 30.

Sec. Lt. Lyman O. Williams, A.S. (Inf.), relieved from detail A.S., Kelly Field, and assigned to Sec. Div., Fort Sam Houston.

Transfer of Sec. Lt. George Almond Ford, A.S., Kelly Field, to Coast Art. Corps, Fort Monroe, announced.

Maj. Leonard H. Drennan, A.S., detailed as recorder of Army Ret. Bd., Chicago.

Vice Maj. Harold S. Martin, A.S., relieved as recorder of Army Ret. Bd., Chicago.

Transfer of Sec. Lt. Leo Douglas Vichules, A.S., Kelly Field, to Coast Art. Corps, Fort Monroe, announced.

Spec. Or. 134, amended to relieve Maj. Lawrence S. Churchill, A.S., Omaha, and to order Major Churchill to proceed to Langley Field.

Sec. Lt. William O. Eareckson, A.S., Kelly Field, to Fort Scott.

U. S. NAVAL AVIATION

Hawaii Flight

Secretary of the Navy Wilbur announced June 20 that Capt. Stanford E. Moses, U.S.N., commander of the battle fleet aircraft squadrons, has been placed in command of the forthcoming West Coast-Hawaiian flight. It has not been definitely decided whether the start of the flight will be made from San Francisco or San Diego. The commander in chief of the United States fleet, Admiral Coontz, has charge of all arrangements and final plans have not yet reached the Navy Department. It is expected that the flight will begin about Sept. 2.

The aircraft tender Aroostook, aircraft carrier Langley and the battleship Arizona will probably be used as station ships in gathering aerological data, forwarding weather reports and relaying dispatches. They will be stationed approximately 600, 1,200 and 1,800 mi. along the line of the flight from the starting point (either San Francisco or San Diego) and Hawaii.

Six destroyers and two mine sweepers will be used to guard the line of flight and will take station between the West Coast and Hawaii. They will be: Doyen, Farragut, McCawley, William Jones, Meyer, Reno, and mine sweepers Tanager and Whippoorwill.

Pigeons in Arctic

Twenty-four highly trained, long distance, carrier pigeons, and 1400 lb. of pigeon food will be a part of the Navy's equipment for the dash to the Arctic by the three Navy planes under command of Lieut. Comdr. R. E. Byrd, U. S. Navy. Fifteen other items appear on a list furnished the Commandant of the Washington Navy Yard to complete this link between the fliers in the frozen north and the United States.

Special emphasis was laid by the Bureau of Engineering on the importance of returning the valuable birds to the Naval Air Station at Anacostia. Their value may become inestimable if they are required to bring back calls for help from the Arctic.

The pigeons were sent by express from Anacostia to Boston and were met there by an experienced Navy Pigeon trainer who explained to the fliers how many grains of corn to feed the birds daily and the proper temperature for their baths when they are at their base at Etah.

The 1400 lb. of food consists of 700 lb. of Argentine corn, 300 lb. of Canada peas, 200 lb. of Kaffir corn and 200 lb. of Red Cross Health pigeon grit. Thus darkest Africa and far away South America will join hands with our continent to provide for the welfare of these pigeons on their summer outing.

Among the articles supplied for the trip are: 25 lb. of tobacco which will provide an ample chewing ration for the birds and leave a small amount for use as disinfectant, pigeon carriers of various sizes, bath tubs, drinking fountains, artificial nests, and message books and instructions for starting the pigeons in the proper direction for the flight home.

Chief Quartermaster H. Kuhee, U. S. Navy, for seven years the pigeon trainer at Anacostia, has been training these racing pigeons for several months, preparing them for long flights over cold country. They have proved themselves capable of flying over 500 mi. a day.

Navy Air Service

Lt. (jg) Thomas G. Murell det. U.S.S. Barker, to temp. duty Nav. Air Sta., Pensacola.

Lt. (jg) Larus C. Lawbaugh det. U.S.S. Idaho to temp. duty Nav. Air Sta., Pensacola.

Ens. Selden B. Spangler det. U.S.S. Barker to temp. duty Nav. Air Sta., Pensacola.

Ens. William B. Tucker det. Nav. Air Sta., Pensacola, to U.S.S. Rochester.

Lt. Nicholas A. Brown det. Navy Yd., N. Y., to Nav. Aircraft Factory, Philadelphia.

Comdr. John Rodgers det. com. U.S.S. Wright to temp. duty Aircraft Sqdns., Battle Flt.

Ens. Bradford E. Grow det. U.S.S. McDermut to temp. duty Nav. Air Sta., Pensacola.

Ens. Thomas F. Carlin det. U.S.S. Farragut to temp. duty Nav. Air Sta., Pensacola.

PUBLISHER'S NEWS LETTER

The accounts that have been sent by cable of the great crowds and the enthusiasm aroused in Germany by the Rundflug and in England by the R A F Pageant should give those who are in a position to direct the trend of aeronautical meets in this country a very plain object lesson Since the government has assumed practically the entire participation in air meets, those in charge have appeared to be willing to let the Services carry the burden and get the resulting publicity It is not too much to say that 90 per cent of the emphasis at Detroit, Dayton and St Louis was placed on the Service types of aircraft The result has been that there has been little or no encouragement given to constructors to take an interest in building new models of commercial types that would be of interest to the spectators

* * * *

Take the Rundflug as an example of what future air events should be Here, the interest of practically all Germany was aroused by the spreading of the net-work of routes for the successive days to include many of the most important cities Prizes of comparatively large monetary value were offered in commemoration of the great war air heroes and not as part of a publicity campaign for some organization or person. Each city added to the purse so that the accumulated amount was of sufficient volume to attract the best skill in German aeronautical circles to enter the contest It is reported that 100 000 people came to see the start which took place at an early hour in the morning in Berlin Large crowds followed the contest all around the circuit and instead of the military element predominating, civilian aviation took a long stride forward. The Rundflug idea should be immediately copied in this country with civilian machines exclusively as entries What organization or group will have the foresight to start the movement ?

* * * *

The British Air Force Pageant has become a fixed event in the program of English air meets Here 100,000 people gathered also to witness the progress being made by the Air Force during the year This gala occasion gave to the Air Force an opportunity to let the people know what they were getting for their money The attendance of the King and Queen, Cabinet ministers, members of Parliament and representatives of foreign governments gave this exhibition the dignity of a great occasion With 120 machines of the latest types on parade, so to speak, giving exhibitions of maneuvering and formation flying, the public could judge for itself the growing utility of aircraft as a military asset. The opportunity of seeing at close range an exhibition of bombing and defense maneuvering was an educational event of the greatest value The show was put on to demonstrate the possibilities of aircraft as a prime element of movements of squadrons in formation by radio was warfare and not as a service or an adjunct to other arms For the King to personally direct the an event of the greatest importance, as it gave the spectators a vivid idea of how a combination of the latest devices may be used for the national defense. The constructors had ten new types of planes that had never been shown publicly before This then, was a real show and had an effect worth the effort.

* * * *

What have we had in this country that can compare to these two great air meets ? Races where speed has been the main requisite have brought great glory to our Services and constructors, but the public has been led to think of any air gathering as one where there must be some speed record broken or some daring piloting of spectacular types of racing planes That this has created a wrong impression in the public mind cannot be denied The general impression that the spectators have gone away with has been the dangerous character of aircraft—the greatest obstacle to the progress of commercial aviation today. Of course, this idea fits in with the military idea, as the public is asked, quite properly, to show especial consideration to our flying personnel in peace time, but when the real advance of the broader development of aviation is considered it is a harmful procedure If those who are proclaiming the coming of commercial aviation want to help in a most practical way, they can decide that in the future there will always be a division between government and civilian air meets. It is only by keeping in mind these two conflicting points of view that we will get real interest in aviation aroused in this country

* * * *

The same line of reasoning may be applied to the constructor's problem In spite of the many statements to the contrary it can be shown that aircraft for government uses and those for civilian purposes are basically different. Both as regards cost and structural strength, the two are as wide apart as the poles The military and naval people think of cost as the last item in considering an airplane's value Sacrifices are made at every step of design, fabrication, and test to get the required performance Just the contrary is true with aircraft or commercial purposes. Safety and earning power are the prime considerations with these types. Costs must be reckoned with continually and no compromises are allowable when life or property is to be transported With these fundamental differences in mind and an incentive provided in the form of substantial rewards for advanced designs, the constructors would not be so enamoured by the size of government orders that they would consider commercial types of machines as a side line —L.D.G.

The Aircraft Service Directory

WHERE TO PROCURE EQUIPMENT AND SERVICES

AIRCRAFT SERVICE DIRECTORY
CONTINUED

INDEX TO ADVERTISERS

A
Accles & Pollock, Ltd ... 25
Advance Aircraft Co ... 23
Aircraft Development Co ... 24
Aircraft Service Directory ... 20-21
Aircraft Supply Co ... 21
Alexander Aircraft Co ... 21 - 25
Anderson Aircraft Manufacturing Co ... 20
Angle, Glenn D ... 20

C
Classified Advertising ... 24
Curtiss Aeroplane & Motor Co, Inc ... 4

D
Decatur Aircraft Co ... 20

F
Ferdinand & Co, L. W ... 25
Foote Bros. Gear & Machine Co ... 25

G
G & C Mfg Co, The ... 21

H
Hamilton Aero Mfg Co ... 20
Hardin, Richard F ... 21
Hartney, Harold Evans ... 21
Haskelite Manufacturing Co ... 21
Huff Daland Aero Corpn ... 21

I
Ireland, G S ... 20

J
Johnson Airplane & Supply Co ... 20 - 23
Johnson Motor Products Co ... 20

L
Lamblin, Etablissements ... 23
Lincoln Standard Aircraft Corpn ... 20
Ludington Exhibition Co., Inc ... 20

M
Martin, Glenn L., Co, The ... 22
Monumental Aircraft Co ... 25

N
New Jersey Veneer Co ... 25
New York University ... 21
Northrop, Marvin A ... 21

O
Ostergaard Aircraft Works ... 20

P
Pander & Zonen, H ... 3
Partridge, Inc ... 20
Perry-Austen Manufacturing Co ... 23
Phenix Aircraft Products Co ... 21
Pioneer Instrument Co ... 20

R
Robertson Aircraft Co ... 25
Roebling's Son's Co, John A ... 25

S
Schroeder, J. L ... 21
Shannon & Wert Bros Aviation Co ... 21
Southern Airways, Inc ... 21
Standard Oil Co ... 2
Summerill Tubing Co ... 23

T
Titanine, Inc ... 25

V
Vought Corporation, Chance ... 27

W
Wallace Aero Co ... 20
Warner, Edward P ... 21
Where to Fly ... 18
Wood Elastic Web Co, J W ... 25
Wright Aeronautical Corp ... 28

Y
Yackey Aircraft Co ... 20

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